

Solve the system

$$\textcircled{1} \quad 2x + y - z = 5 \quad \checkmark$$

$$3x - y + 2z = -1 \quad \checkmark$$

$$x - y - z = 0 \quad \checkmark$$

Elimination

$$\begin{array}{r} 2x + y - z = 5 \\ 3x - y + 2z = -1 \\ \hline \end{array}$$

$$5x \quad + z = 4$$

$$z = 4 - 5x$$

$$z = 4 - 5(1)$$

$$z = 4 - 5$$

$$\boxed{z = -1}$$

$$\begin{array}{r} x - y - z = 0 \\ 2x + y - z = 5 \\ \hline \end{array}$$

$$3x - 2z = 5$$

$$3x - 2(4 - 5x) = 5$$

$$3x - 8 + 10x = 5$$

$$13x = 13$$

$$\boxed{x = 1}$$

Back Substitution

$$\textcircled{2} \quad x - y + 2z = 15$$

$$y + 2z = 8$$

$$z = \boxed{5}$$

Row-echelon form

$$x - y - z = 0$$

$$1 - y + 1 = 0$$

$$2 - y = 0$$

$$-y = -2$$

$$\boxed{y = 2}$$

70 | 7.1

\$25,000 plus 1%

20,000 plus 2%

y - total \$

x - sales

$$y = 0.01x + 25,000$$

$$y = 0.02x + 20,000$$

$$0.01x + 25,000 = 0.02x + 20,000$$

$$5000 = 0.01x$$

$$x = 500,000$$

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$$Y = 20.50x - 16,000$$

↓  
Profit

$$0 = 20.50x - 16,000$$

$$16,000 = 20.50x$$

$$x \approx 780.5$$

$$x = 781$$

$$7.5a + 4c = 3312.50$$

$$(-4) \quad a + c = 500$$

$$7.5a + 4c = 3312.50$$

$$\underline{-4a - 4c = -2000}$$

$$3.5a = 1312.50$$

$$\boxed{\begin{array}{l} a = 375 \\ c = 125 \end{array}}$$

(63)

$$0.40x + 0.65y = 0.50(20)$$

$$(-0.40) \quad x + y = 20$$

$$0.40x + 0.65y = 10$$

$$\underline{-0.40x - 0.40y = -8.0}$$

$$0.25y = 2$$

$$\boxed{y = 8}$$

$$\boxed{x = 12}$$

Gaussian Elimination

$$\begin{aligned} 2x - 4y + 6z &= -6 \\ -x + 2y + 4z &= 17 \\ x + 2y - 2z &= 3 \end{aligned} \Rightarrow \left[ \begin{array}{ccc|c} 2 & -4 & 6 & -6 \\ -1 & 2 & 4 & 17 \\ 1 & 2 & -2 & 3 \end{array} \right] \text{ Goal Row echelon form}$$

Elementary Row operations

① Switch any two rows

② mult. any row by a constant

③ Add any two rows &amp; keep result.

$$\left[ \begin{array}{ccc|c} 1 & \# & \# & \# \\ 0 & 1 & \# & \# \\ 0 & 0 & 1 & \# \end{array} \right]$$

$$\left[ \begin{array}{ccc|c} 2 & -4 & 6 & -6 \\ -1 & 2 & 4 & 17 \\ 1 & 2 & -2 & 3 \end{array} \right] \Rightarrow \left[ \begin{array}{ccc|c} 1 & 2 & -2 & 3 \\ -1 & 2 & 4 & 17 \\ 2 & -4 & 6 & -6 \end{array} \right] \text{ Switched } R_1 \text{ \& } R_3$$

$$\left[ \begin{array}{ccc|c} 2 & -4 & 6 & -6 \\ 1 & 2 & -2 & 3 \\ 0 & 4 & 2 & 20 \end{array} \right] \xrightarrow{\text{add } R_1 \text{ to } R_2} \left[ \begin{array}{ccc|c} 1 & 2 & -2 & 3 \\ 0 & 4 & 2 & 20 \\ 0 & -8 & 10 & -12 \end{array} \right] \text{ } -2R_1 \text{ added to } R_3$$

$$\left[ \begin{array}{ccc|c} 1 & 2 & -2 & 3 \\ 0 & 1 & \frac{1}{2} & 5 \\ 0 & -8 & 10 & -12 \end{array} \right] \xrightarrow{R_2 \div 4} \left[ \begin{array}{ccc|c} 1 & 2 & -2 & 3 \\ 0 & 1 & \frac{1}{2} & 5 \\ 0 & 0 & 14 & 28 \end{array} \right] \text{ } 8R_2 + R_3$$

$$\left[ \begin{array}{ccc|c} 1 & 2 & -2 & 3 \\ 0 & 1 & \frac{1}{2} & 5 \\ 0 & 0 & 1 & 2 \end{array} \right] \xrightarrow{R_3 \div 14} \begin{aligned} x + 2y - 2z &= 3 \\ y + \frac{1}{2}z &= 5 \\ z &= 2 \end{aligned}$$

$$\boxed{x = -1, y = 4, z = 2}$$

Solve w/ Gaussian Elimination

$$2x + 2y - z = 10$$

$$x - 2y + z = -4$$

$$-4x + y - 2z = 1$$

$$(2, 1, -4)$$

Sect. 7.3

#2, 9, 13, 16, 37, 40